



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/576,498

04/20/2006

Masahiko Hamanaka

01070078AA

6288

30743

7590

05/29/2008

WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C.
11491 SUNSET HILLS ROAD
SUITE 340
RESTON, VA 20190

EXAMINER

RUSH, ERIC

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

05/29/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/576,498	Applicant(s) HAMANAKA, MASAHIKO	
	Examiner ERIC RUSH	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/20/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 23 is objected to because of the following informalities: Claim 23 depends from claim 10 but it appears to depend from claim 19. The Examiner will treat claim 23 as depending from claim 19 for the purposes of examination. Appropriate correction is required.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 19 – 27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claimed invention appears to be directed towards a computer program, which is not patentable eligible subject matter. Any computer executable software code must be stored in a computer readable storage medium to enable the underlying functionality. A structural and functional interrelationship between the computer program and the structural elements of the computer, which would permit its functionality to be realized, should be included in the claim. An example of acceptable language under 35 U.S.C. 101 would be "a computer readable medium storing a computer program...".

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 10-12, 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Dionysian U.S. Patent No. 6,002,782.

- With regards to claims 1, 10, and 19, Dionysian teaches an image comparison system, method and program characterized by comprising: three-dimensional data input means for inputting three-dimensional data of an object; (Dionysian, Figure 1, Column 3 Lines 20 - 35) reference image storing means for storing a reference image of a least one object; (Dionysian, Column 4 Lines 22 – 26) pose candidate deciding means for generating at least one pose candidate as a candidate for pose of the object; (Dionysian, Column 4 Lines 29 - 58, Dionysian teaches transforming the three-dimensional model in order to coincide the model with the viewing direction of the access image) comparison image generating means for generating at least one comparison image close to the reference image while projecting the three-dimensional data onto a two-dimensional image in accordance with the pose candidate; (Dionysian, Column 6 Lines 5 - 27) and image comparing means for performing comparison on the basis of one of a distance value and a similarity degree between the reference image and the comparison image. (Dionysian, Column 6 Lines 28 - 58)

- With regards to claims 2, 11, and 20, Dionysian teaches an image comparison system, method and program according to claims 1, 10, and 19, respectively, characterized in that said image comparing means comprises: calculating means for calculating one of the distance value and the similarity degree between the reference image and the comparison image; (Dionysian, Column 6 Lines 23 – 67, a correlation value is obtained, i.e. similarity degree) selecting means for selecting one of a minimum distance value which is a smallest distance value and a maximum similarity degree which is a largest similarity degree; (Dionysian, Column 6 Lines 23 – 67 and Column 7 Line 64 - Column 8 Line 4) and comparing means for performing comparison on the basis of one of a result of comparison between the minimum distance value and a threshold value and a result of comparison between the maximum similarity degree and a threshold value. (Dionysian, Column 6 Lines 23 – 67, the correlation value must exceed a threshold)

- With regards to claims 3, 12, and 21, Dionysian teaches an image comparison system, method and program according to claims 1, 10, and 19, respectively, characterized in that said comparison image generating means generates a comparison image close to each reference image, (Dionysian, Column 6 Lines 5 - 27) and said image comparing means comprises: calculating means for calculating one of a distance value and a similarity degree between each reference image and the comparison image; (Dionysian, Column 6 Lines 23 – 67 and Column 7 Line 64 - Column

Art Unit: 2624

8 Line 4) selecting means for selecting one of a minimum distance value which is a smallest distance value and a maximum similarity degree which is a largest similarity degree for each reference image; (Dionysian, Column 6 Lines 23 – 67 and Column 7 Line 64 - Column 8 Line 4) and comparing means for outputting, as a comparison result, one of a reference image including a smallest minimum distance value which is a smallest one of minimum distance values and a reference image including a largest maximum similarity degree which is a largest one of maximum similarity degrees. (Dionysian, Column 6 Lines 23 – 67)

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 4, 7-9, 13, 16-18, 22, and 25- 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dionysian U.S. Patent No. 6,002,782 as applied to claims 1,

10, and 19 above, and further in view of Kawakami et al. U.S. Publication No. 2001/0020946 A1.

- With regards to claims 4, 13, and 22, Dionysian teaches an image comparison system, method and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program further characterized by further comprising: reference correction coefficient storing means for storing a correction coefficient corresponding to the reference image; and correcting means for correcting one of the minimum distance value and the maximum similarity degree by using the correction coefficient. Kawakami et al. teach a system, method and program further characterized by further comprising: reference correction coefficient storing means for storing a correction coefficient corresponding to the reference image; (Kawakami et al., Fig. 1, Page 6 Paragraphs 0080 - 0087) and correcting means for correcting one of the minimum distance value and the maximum similarity degree by using the correction coefficient. (Kawakami et al., Page 6 Paragraphs 0080 – 0087) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian with the teachings of Kawakami et al. This modification would have been prompted in order to account for variations in various conditions between the reference and comparison images.

- With regards to claims 7, 16, and 25, Dionysian teaches an image comparison system, method and program according to claims 1, 10, and 19,

respectively. Dionysian fails to teach a system, method and program characterized by further comprising: representative three-dimensional object model storing means for storing representative ones of three-dimensional object models as representative three-dimensional object models; group storing means for storing related information of the representative three-dimensional object models and reference images; three-dimensional comparing means for comparing the input three-dimensional data with the representative three-dimensional object models, and selecting a representative three-dimensional object model similar to the three-dimensional data; and reference image selecting means for selecting a reference image corresponding to the selected representative three-dimensional object model by referring to the related information, wherein said image comparing means compares the selected reference image with the input three-dimensional data. Kawakami et al. teach a system, method and program characterized by further comprising: representative three-dimensional object model storing means for storing representative ones of three-dimensional object models as representative three-dimensional object models; (Kawakami et al., Page 2 Paragraph 0033) group storing means for storing related information of the representative three-dimensional object models and reference images; (Kawakami et al., Page 2 Paragraph 0033, Page 3 Paragraphs 0045 - 0048) three-dimensional comparing means for comparing the input three-dimensional data with the representative three-dimensional object models, (Kawakami et al., Page 3 Paragraphs 0040 - 0042) and selecting a representative three-dimensional object model similar to the three-dimensional data; (Kawakami et al., Page 3 Paragraphs 0040 - 0042) and reference image selecting

means for selecting a reference image corresponding to the selected representative three-dimensional object model by referring to the related information, (Kawakami et al., Page 3 Paragraphs 0040 - 0042) wherein said image comparing means compares the selected reference image with the input three-dimensional data. (Kawakami et al., Fig. 1, Page 2 Paragraph 0033, Page 3 Paragraphs 0045 - 0048) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian with the teachings of Kawakami et al. This modification would have been prompted in order to more accurately compare reference data with inputted data of the same orientation whilst taking into account numerous variations between the two inputs.

- With regards to claims 8, 17, and 26, Dionysian teaches an image comparison system, method and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program characterized by further comprising: representative image storing means for storing representative ones of images as representative images; group storing means for storing related information of the representative images and reference images; representative image selecting means for comparing the input three-dimensional data with the representative images, and selecting a representative image similar to the three-dimensional data; and reference image selecting means for selecting a reference image corresponding to the selected representative image by referring to the related information, wherein said image comparing means compares the selected reference image with the input three-

dimensional data. Kawakami et al. teach a system, method and program characterized by further comprising: representative image storing means for storing representative ones of images as representative images; (Kawakami et al., Fig. 1, Page 3 Paragraphs 0041 - 0045) group storing means for storing related information of the representative images and reference images; (Kawakami et al., Page 3 Paragraphs 0046 - 0048) representative image selecting means for comparing the input three-dimensional data with the representative images, (Kawakami et al., Page 7 Paragraphs 0102 -0103) and selecting a representative image similar to the three-dimensional data; (Kawakami et al., Page 7 Paragraphs 0102 - 0103) and reference image selecting means for selecting a reference image corresponding to the selected representative image by referring to the related information, (Kawakami et al., Fig. 1, Page 2 Paragraph 0033, Page 3 Paragraphs 0040 - 0048) wherein said image comparing means compares the selected reference image with the input three-dimensional data. (Kawakami et al., Page 7 Paragraphs 0102 - 0103) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian with the teachings of Kawakami et al. This modification would have been prompted in order to more accurately compare reference data with inputted data of the same orientation whilst taking into account numerous variations between the two inputs.

- With regards to claims 9, 18 and 27, Dionysian in view of Kawakami et al. teach an image comparison system, method and program according to claims 4, 13, and 22, respectively. Dionysian fails to teach a system, method and program

Art Unit: 2624

characterized in that the correction coefficient is determined on the basis of at least one of a distance value and a similarity degree between a representative three-dimensional object model and the reference image. Kawakami et al. teach a system, method and program characterized in that the correction coefficient is determined on the basis of at least one of a distance value and a similarity degree between a representative three-dimensional object model and the reference image. (Kawakami et al., Page 6 Paragraphs 0080 - 0087)

5. Claims 5-6, 14-15, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dionysian U.S. Patent No. 6,002,782 as applied to claims 1, 10, 19 above, and further in view of Roy et al. U.S. Patent No. 6,956,569.

- With regards to claims 5, 14, and 23, Dionysian teaches an image comparison system, method and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program further characterized by further comprising reference weighting coefficient storing means for storing a weighting coefficient corresponding to the reference image, said image comparing means comprising calculating means for calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the weighting coefficient corresponding to the reference image. Roy et al. teach a system, method and program further characterized by further comprising reference weighting coefficient storing means for storing a weighting coefficient

Art Unit: 2624

corresponding to the reference image, (Roy et al., Column 6 Lines 5 – 26 and Lines 34—60, Column 9 Line 64 – Column 10 Line 58) said image comparing means comprising calculating means for calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the weighting coefficient corresponding to the reference image. (Roy et al., Column 10 Line 41 – Column 11 Line 12) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian with the teachings of Roy et al. This modification would have been prompted in order to account for variations in lighting conditions between the reference and comparison images.

- With regards to claims 6, 15, and 24, Dionysian teaches an image comparison system, and program according to claims 1, 10, and 19, respectively. Dionysian fails to teach a system, method and program characterized by further comprising: extracting a three-dimensional reference point from the input three-dimensional data; and obtaining a coordinate correspondence of a standard three-dimensional weighting coefficient to the three-dimensional data by using a standard three-dimensional reference point corresponding to a standard three-dimensional object model and the three-dimensional reference point of the three-dimensional data, and converting the standard three-dimensional weighting coefficient into a two-dimensional weighting coefficient in accordance with the pose candidate, the step of performing comparison comprising the step of calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the

converted two-dimensional weighting coefficient. Roy et al. teach a system, method and program characterized by further comprising: extracting a three-dimensional reference point from the input three-dimensional data; (Roy et al., Column 12 Line 27 – Column 13 Line 12) and obtaining a coordinate correspondence of a standard three-dimensional weighting coefficient to the three-dimensional data by using a standard three-dimensional reference point corresponding to a standard three-dimensional object model and the three-dimensional reference point of the three-dimensional data, (Roy et al., Column 12 Line 27 – Column 13 Line 12) and converting the standard three-dimensional weighting coefficient into a two-dimensional weighting coefficient in accordance with the pose candidate, (Roy et al., Column 11 Lines 42 – 52, Column 12 Line 58 – Column 14 Line 7) the step of performing comparison comprising the step of calculating one of the distance value and the similarity degree between the reference image and the comparison image by using the converted two-dimensional weighting coefficient. (Roy et al., Column 10 Line 34 – Column 11 Line 12) It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Dionysian with the teachings of Roy et al. The modification would have been prompted in order to accurately map 3D correcting coefficients to the coefficients needed to correct the corresponding 2D image.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Ishiyama U.S. Patent No. 7,218,773; which is directed towards a pose estimation method and apparatus.
- Ishiyama U.S. Patent no. 7,227,973; which is directed towards a 3-D image comparison device, method, and program.
- Kzauhiro et al. JP Publication 10-232934 A; which is directed towards a face image registering device and its method.
- Shigeaki et al. JP Publication No. 2001-222716 A; which is directed towards a personal identification system and method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC RUSH whose telephone number is (571)270-3017. The examiner can normally be reached on 7:30AM - 5:00PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ER

/Samir A. Ahmed/

Supervisory Patent Examiner, Art Unit 2624